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What's Your Radiographic Diagnosis?

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History and Physical Exam:

A one year old Arab filly presented in lateral recumbency having been found that way in the morning in the stall. The filly was reportedly normal the previous day.

Body temperature and pulse rate were normal. Respiratory rate was increased (30 breaths/minute). The horse could not stand. When stimulated the horse would attempt to stand with the front legs but the hind legs were more flaccidly paralyzed. Deep pain sensation was present in all limbs.

Radiographs of the cervical spine were taken under general anethesia (figs. 1&2).

Radiographic Findings:

Alignment of the spinal canal at C3-4 is seen to be abnormal (fig 1). The cranial portion of the body of C-4 projects dorsally into the spinal canal creating a dramatic "step-effect" in the alignment of the floor of the canal. The caudal dorsal margin of the body of C-3 is remodeled with resultant projection into the vertebral canal. As a result, the diameter of the spinal canal at the C3-4 level is drastically narrowed. The degree of narrowing was increased with mild ventral flexion of the neck.

A myelogram was done to assess the extent of spinal cord compression (fig. 2). A film taken with mild ventral flexion of the neck showed complete

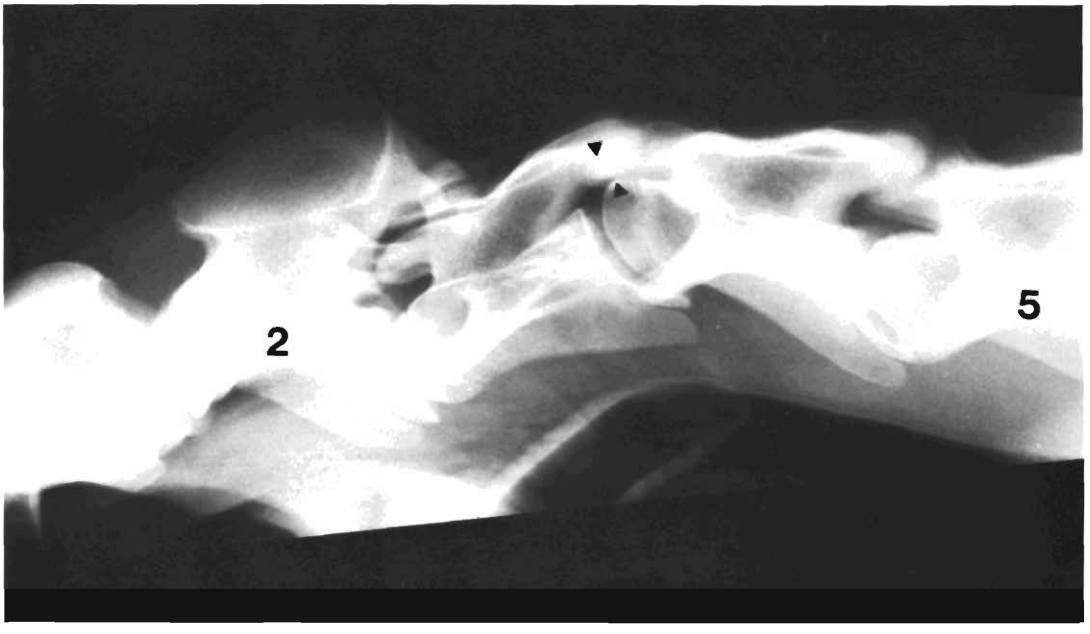

Fig. 1. This is a survey radiograph of the cervical spine with the head flexed. The structural changes of the caudal part of the body of C-3 can be seen by comparing C-4. The marked narrowing of the neural canal at the C3-4 junction (arrowheads) secondary to the vertebral instability is seen.

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obliteration of the ventral contrast column and nearby the complete obliteration of the dorsal contrast column at C3-4 when compared to C4-5.

Radiographic Diagnosis:

Cervical vertebral malformation and instability involving C3 and C4 with marked spinal cord compression. Considering the extreme degree of spinal cord compression and clinical signs, a very poor diagnosis was given and the owners requested euthanasia of the horse.

Discussion:

The primary differential diagnosis of acute foreleg paresis and hindleg paralysis in this young horse included cervical vertebral fracture and cervical vertebral malformation exacerbated by unknown trauma. Viral, parasitic, toxic and degenerative causes of neurologic disease were considered less likely in this patient. Radiography is the most definitive diagnostic procedure for evaluating anatomical abnormalities of the vertebral column. Fractures would be recognized by the radiolucent fracture line and displacement of the fragments. The radiographic changes of cervical vertebral malformation vary with the degree of malformation. Survey radiographs can reveal narrowing of the vertebral canal, abnormal vertebral angulation and an unstable articulation which may show a significant change in vertebral alignment with neck flexion.[1] The lesions may be subtle and the full extent of spinal cord compression can be determined only by contrast myelography.[2]

Cervical vertebral malformation is thought to have a multifactorial pathogenesis. Factors of abnormal bone development such as caloric and nutritional imbalances, excessive biomechanical stresses and osteochondrosis are all considered to have an influence.[1] An inherited mode of transmission has not been proven.[2] Two subclassifications of cervical vertebral malformation are recognized. Cervical vertebral instability occurs most frequently in horses 6 to 12 months of age and predominately involves the mid-cervical region, C3 through C5. Cervical static stenosis typically is manifest in horses 1 to 4 years of age and involves the lower cervical vertebra, C5/6 and C6/7. Cervical static stenosis more typically involves the articular facets and their supporting ligaments.[1]

The prognosis for horses with cervical vertebral malformation is dependent on the degree of malformation, severity of neurologic dysfunction, duration of clinical signs, and intended use.[1] Surgical treatment has been beneficial in some cases.

References

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2. Gavin, P.R., The Equine Spine, *Textbook of Veterinary Diagnostic Radiology,* D.E. Thrall, ed., W.B. Saunders, 1986, pp. 86-88.

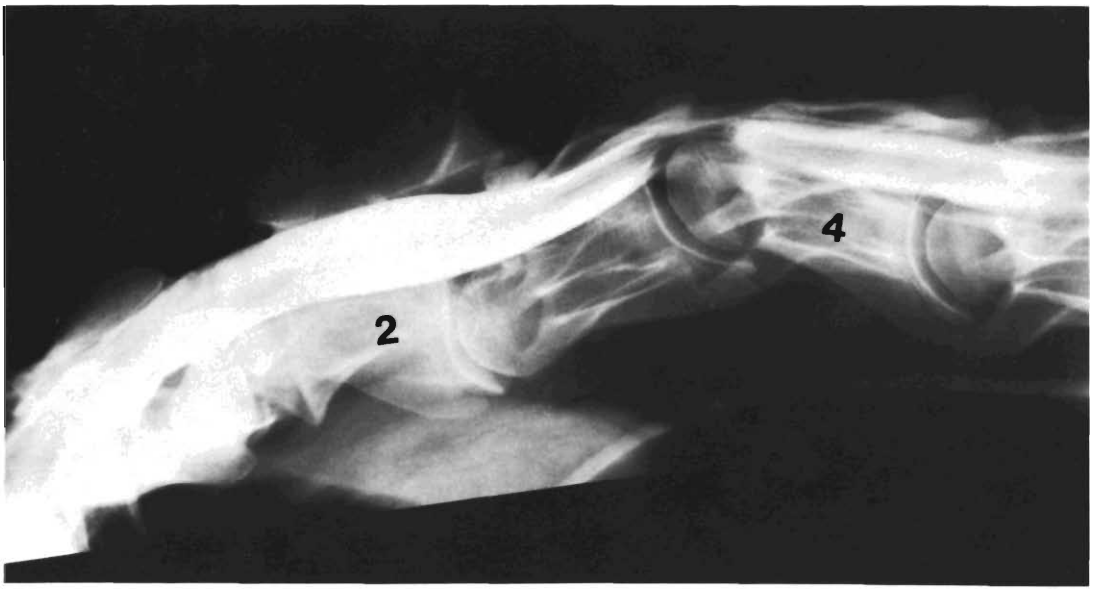

Fig. 2. This is a myelographic study of the spinal cord of the horse in Fig. 1. With mild head and neck flexion the dorsal and ventral contrast columns are obliterated at C3-4. This indicates the severe degree of spinal cord compression caused by the combination of cervical vertebral malformation and instability.